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A novel ArcTic bacteRial species as greEn fActory for SUstainable agricultuRE (TREASURE)

ABSTRACT

The conflict between Russia and Ukraine is increasing the prices not only of energy but also of cereals, with severe consequences on the agro-food sector. During the time, Italy has become a transforming country. Almost half of the cultivable areas has been left, since it was more profitable to import than to cultivate. Now, we must go back to producing to face market oscillations. Agricultural strategies must be implemented to favourite this trend, improving production yields while respecting food safety, avoiding the massive exploitation of the fields. Therefore, the use of deeply specialised biological systems as safe technology for soil, plants and food products can routinely improve the productivity. In particular, the modifications of soil microbial communities drove by the controlled addition of bacteria as plant growth promoting (PGP) technology is a new practice in agriculture. Therefore, this proposal aims to test the suitability of a new psychrophilic bacterium, belonging to the genus Pseudomonas, isolated from a permafrost thaw lake sample, in subarctic Quebec, Canada, as PGP. *Pseudomonas* strain 2ASCA synthesizes Levan, a polysaccharide that accumulates outside the cell, remaining slightly adhered to the wall itself and with heavy metal chelating capability. Barley (*Hordeum vulgare* L.) is one of the main crops cultivated all over the world and Russia was the major producer in 2018. In this proposal, barley is chosen as model organism, as it represents one of the main sources of carbohydrates in developing countries, where it is grown by small farmers in many arid areas.

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